

CLAIMS

What is claimed is:

1. A power transfer device comprising:
 - a casing;
 - a lubricant reservoir in said casing;
 - a shaft rotatably supported in said casing, the shaft extending into said lubricant reservoir;
 - a lubricant in said lubricant reservoir; and
 - a lubricant driving structure coupled to said shaft for common rotation therewith, the lubricant driving structure including at least one helically shaped member that extends longitudinally along and circumferentially about at least a portion of said shaft, said at least one helically shaped member being at least partially located in said lubricant reservoir;

wherein rotation of said at least one helically shaped member drives a portion of said lubricant in an axial direction along said shaft and away from said lubricant reservoir.
2. A power transfer device of Claim 1, wherein said at least one helically-shaped member comprises a plurality of circumferentially-spaced apart teeth that extend radially outwardly of said shaft.

3. A power transfer device of Claim 2, wherein said teeth taper radially outwardly along a direction that is generally opposite an axial direction in which the portion of the lubricant is driven.

4. A power transfer device of Claim 1 wherein said at least one helically shaped member is integrally formed with the shaft.

5. A power transfer device of Claim 1, wherein said shaft extends into a hole formed into another component of the power transfer device and wherein said at least one helically shaped member terminates axially along said shaft prior to a point at which said shaft enters said hole.

6. The power transfer device of Claim 5, wherein a recessed area is formed into said another component about said hole.

7. The power transfer device of Claim 1, wherein said shaft extends into a hole formed into another component of the power transfer device and wherein said at least one helically shaped member extends through said hole.

8. A power transfer device comprising:

- a casing;
- a lubricant reservoir in said casing;
- a lubricant in said lubricant reservoir;
- a shaft rotatably supported within said casing and extending into said lubricant reservoir;
- a differential assembly coupled to said shaft;

wherein said shaft includes threads defined along a circumferential surface thereof, said threads operable to direct a portion of said lubricant from said lubricant reservoir in a direction axially along said shaft and toward said differential assembly.

9. The power transfer device of claim 8 wherein said input shaft is mounted for rotation within a structure, said structure being spaced radially apart from said threads to form a fluid passage.

10. The power transfer device of claim 8 wherein said threads are formed along an intermediate portion of said output shaft and define an entry portion wherein said lubricant comes into contact with said threads and a delivery portion wherein said lubricant is output in a direction toward said differential assembly.

11. The power transfer device of claim 10 wherein said casing defines a passage adapted to permit said lubricant to return to said lubricant reservoir from said differential assembly.

12. The power transfer device of claim 11 wherein said entry portion of said threads is disposed in said fluid reservoir.

13. The power transfer device of claim 12 wherein said passage delivers lubricant to said lubricant reservoir proximate said entry portion of said threads.

14. A power transfer device comprising:

- a casing;
- a lubricant reservoir in said casing;
- a lubricant in said lubricant reservoir;
- a shaft rotatably supported within said casing and extending into said lubricant reservoir;
- a differential assembly coupled to said shaft;
- an oil propeller wheel fixedly mounted around said shaft for rotation therewith, said oil propeller wheel communicating with said lubrication in said lubricant reservoir and operable to direct a portion of said lubricant from said lubricant reservoir in a direction axially along said shaft and toward said differential assembly.

15. The power transfer device of claim 14 wherein said shaft extends through a hole in a first member, the first member having a recessed portion for accommodating said oil propeller wheel.

16. The power transfer device of claim 16 wherein an annular space is defined between said first member and said shaft, the annular space forming a passage for delivering said lubrication from said oil propeller wheel to said differential assembly.

17. The power transfer device of claim 16 wherein said oil propeller wheel includes a main body portion having gear type teeth disposed radially therearound.

18. The power transfer device of claim 17 wherein said gear type teeth extend from a first end of said main body portion to a wall portion formed at a second end of said main body portion.

19. The power transfer device of claim 18 wherein said gear type teeth extend in a generally helical pattern tapering outwardly and defining blade portions from said first end of said body portion to said second end of said body portion.

20. The power transfer device of claim 18 wherein said wall portion is operable to inhibit lubrication from flowing from said second end portion in a direction away from said first end portion.

21. The power transfer device of claim 14 wherein said casing defines a passage adapted to deliver said lubricant from an area adjacent said differential assembly to said lubricant reservoir.